

REMARKS

Claim 9 was said to be allowable if rewritten in independent form, which has been done. The allowance of Claim 9 is gratefully acknowledged.

Claims 1, 10, 11 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by US Pat. 5,178,150 (Silverstein et al.) Claim 1 describes an ultrasonic probe including a transducer located at a distal end of the probe, the transducer being moved within the chamber to scan an image region outside the probe, comprising a fluid chamber enclosing the transducer within the probe; an acoustic fluid which is highly transmissive of ultrasound located in the fluid chamber; and a thin-walled volume compensation balloon formed of a high performance thermoplastic material in fluid communication with the fluid chamber, the volume compensation balloon containing a small fraction of the fluid of the fluid chamber at room temperature. Since the volume compensation balloon is formed of a high performance thermoplastic material, it will not stretch as an elastomeric material will. The balloon can therefore be contained in a very small space in the probe, which is already crowded with the drive mechanism and signal leads to the transducer. Being a thin-walled balloon, little space is consumed by the balloon material itself. At room temperature the volume compensation balloon is limp with only a small fraction of the fluid of the fluid chamber for which it provides volume compensation. If the temperature of the probe increases the balloon will begin to fill with fluid and compensate for expansion of the fluid in the transducer chamber.

The bag 62 of Silverstein et al. is not a volume compensation balloon, but forms the transducer fluid chamber of the Silverstein et al. probe. As the Examiner notes, the bag 62 is both the fluid enclosure and the compensation mechanism. It is not thin-walled as is the compensation balloon of the present invention, but is "fairly bulky" as stated in column 5, line 64 of Silverstein et al. as it must withstand the rigors of insertion and contact within the body without breaking. The bag 62 does not contain a "small fraction of the fluid of the fluid chamber" as called for by Claim 1, but contains all of the fluid of the Silverstein et al. probe. It is also not formed of a high performance thermoplastic, but is highly elastomeric. As stated in column 8, lines 17-19 of Silverstein et al., "The inventive ultrasound probe has been described as using a flexible bag 62 that is stretched by the transducer body 50 to reconfigure the shape of the bag 62" as shown in Fig. 3B. Thus, the bag 62 of Silverstein et al. lacks virtually all of the characteristics of the volume compensation balloon recited in

Claim 1. For these reasons it is respectfully submitted that Claim 1 cannot be anticipated by Silverstein et al.

Claim 10 describes an ultrasonic probe for three dimensional imaging comprising a probe body enclosing a fluid chamber; an array transducer movably mounted within the fluid chamber; a drive mechanism coupled to the array transducer to move the array transducer during scanning; an acoustic fluid located within the fluid chamber; and a volume compensation balloon in fluidic communication with the fluid chamber, the balloon being formed of a substantially non elastic material and being partially expanded at room temperature. First, it is not apparent that Silverstein et al. use an array transducer; they only say that they have an "ultrasound transducer 52." Silverstein et al. also have no drive mechanism to move the array during scanning. Instead, an actuating member 90 is manipulated manually to reciprocate the transducer for linear or rotational scanning as stated in column 7, lines 44-57. And as previously mentioned, the bag 62 is not a volume compensation balloon, it is not "substantially non elastic" (it is very elastic and stretchy), it is fully (not partially) expanded at room temperature, and it is not "half filled" at room temperature as stated in Claim 11. For all of these reasons it is respectfully submitted that Claim 10 and its dependent Claims 11 and 18 cannot be anticipated by Silverstein et al.

Claims 2-8 and 11-17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Silverstein et al. in view of US Pat. 7,479,128 (Lenz). Lenz is not concerned with ultrasonic probes or volume compensation balloons for fluid-filled probes at all. Lenz is directed to a balloon for a balloon catheter. Lenz is principally concerned with putting a protective coating on a balloon of a balloon catheter to improve the durability of the balloon. This is because the balloon must survive insertion into and passage through the body without scratching, puncturing or abrasion. These are not problems for a volume compensation balloon of the present invention, which is well protected inside the probe. Lenz states that his balloon may constructed of a thermoplastic elastomer (col. 4, line 25). He says that the balloon wall may be compliant or noncompliant (col. 4, line 43). Thus, he does not care if his balloon is very stretchy or cannot stretch at all. Furthermore, his balloon does not contain a small fraction of the fluid of a fluid chamber. It is inserted empty, then inflated to force open an occlusion in a blood vessel or deliver a biologically compatible fluid. It is seen that Lenz provides no guidance at all about balloons to use for volume compensation in an ultrasound probe. For all of these reasons it is respectfully submitted that Lenz cannot be combined with Silverstein et al. (which itself has not volume compensation balloon, either) to render Claims 2-8 and 11-17 unpatentable.

The Wang et al. patent has been reviewed and is not believed to affect the above claims.

The specification has been updated by providing the serial numbers of related, concurrently filed patent applications.

In view of the foregoing amendment and remarks, it is respectfully submitted that Claim 9 is now in allowable form, that Claims 1, 10, 11 and 18 are not anticipated by Silverstein et al., and that Claims 2-8 and 11-17 are patentable over Silverstein et al. and Lenz.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

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